



MSIAC M&S Newsletter

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If you would like to submit an article to be highlighted in the *MSIAC M&S Newsletter*, please forward the article (along with its source data and URL, if available) to the MSIAC Help Desk no later than 15 workdays prior to the publication of the next Newsletter. Normally, the Newsletter is published on/about the first of each month. Potential articles as well as questions or comments on the Newsletter can be emailed to msiachelpdesk@msiac.dmsi.mil.

The MSIAC also publishes the quarterly *MSIAC Journal On-line*. If you would like to see the current issue of the *MSIAC Journal On-line* visit:

<http://www.msiac.dmsi.mil/journal>. If you would like to submit an article for the Journal On-line, please email your paper or article to msiachelpdesk@msiac.dmsi.mil at least 45 days prior to the next publication date.

UPCOMING EVENTS

9-12 January 2006

[44th AIAA Aerospace Sciences Meeting Exhibit](#)

Reno, NV

10-12 January 2006

[AFCEA West 2006](#)

San Diego, CA

24-26 January 2006

[Defending America/SpaceComm 2006 Symposium](#)

Colorado Springs, CO

31 January - 2 February 2006

[Strategic and Tactical Missile Systems Conference](#)

Monterey, CA

5-10 February 2006

[2006 International Conference on Modeling and Simulation Technology for Power Plants \(PowerPlantSim'06\)](#)

Atlanta, GA

6 February 2006

[First Annual Modeling and Simulation Leadership Summit](#)

Suffolk, VA

7-8 February 2006

[DWT M&S in Transformation & System Engineering](#)

Bonn-Bad Godesberg, Germany

8-10 February 2006

[Society for Applied Learning Technologies \(SALT\)](#)

Orlando, FL

15-17 February 2006

[AUSA 2006 Winter Symposium and Exhibition](#)

Ft. Lauderdale, FL

FIRST ANNUAL MODELING AND SIMULATION LEADERSHIP SUMMIT

The Congressional Modeling and Simulation Caucus, led by Virginia's 4th District vice Suffolk's Congressman Randy Forbes, will hold the first annual Modeling and Simulation Leadership Summit on February 6 in Suffolk, VA. The event is being

sponsored by NTSA. It will address M&S issues on the national level.

The intent of the one day meeting is to gather M&S leaders and decision makers from government agencies, industry, academia, and Congress to discuss the critical issues facing the M&S community of practice today and to consider what legislative policies might be changed or developed to the hands of the end user. The issues to be discussed can be reasonably segmented into the following general categories: Industrial Development, Business Practice, Technology, and Professional Development.

U.S. AIR FORCE TO DEVELOP WARCON TOOLKIT

The U.S. Air Force has contracted with Stottler Henke Associates of San Mateo, CA to develop a piece of software capable of letting subject matter experts put content into, or actually build from "scratch", specific-use war games. The software, called WarCon, is a toolkit that will provide a visual authoring environment and a collaborative authoring assistant which are designed to help and guide a game's creator, while an associated simulation engine handles complex scenarios with hundreds of entities.

Initially, WarCon will be available in three unique versions: Forge - for creating custom software "building blocks" to build a new game, Build - for users who want to combine these building blocks in different ways to create additional new games, and Edit - for users who want to make simple changes to existing games built through WarCon.

The WarCon software is planned for use at four separate Air Force schools, all located at the Maxwell Air Force Base Air University. For original article visit:
http://www.iitsec.org/documents/day1_2005.pdf

MODELING AND ENHANCING C4ISR WITH EXECUTABLE DoDAF ARCHITECTURES

Under the guidance of Col David M. Votipka, Commander of the Air Force Agency for Modeling and Simulation (AFAMS) led an effort to Model and Enhance C4ISR with Executable Architectures (EA). The effort was originally based on MITRE 's Executable Architecture Methodology Assessment (EAMA) idea to use simulator engines with Petri Net technology to "give life" to static DoDAF architectures.

The baseline for this executable architecture effort was a static architecture thread from a Distributed Mission Operation Center (DMOC) Virtual Flag (VF) Exercise – the VF Time Sensitive Targeting (TST) Special Operations Forces (SOF) Vignette Architecture, version 3.0, 11 July 2005. A DMOC VF exercise is an event that integrates seamless Live, Virtual and Constructive (LVC) environments to allow warfighters to train as they would expect to fight – using primarily operational systems in a realistic training environment linked with weapons systems and C4ISR systems to create an interactive environment.

Different simulators can provide different OV-6c Activity node simulations, while still operating together in the same EA. As the central control for the simulation, the EA simulator, we chose a discrete simulator, Rockwell's Arena. There are 4 major components to this system, the EA simulator, the network simulator, the combat simulator, and the High Level Architecture (HLA) network. HLA also determined the simulated message transit time by linking with the OpNet Network Simulator model. The network simulator finds the message transit duration.

The system uses Petri Net technology to coordinate the multiple swim lanes of processing. The appropriate messages into a node trigger processing which triggers more messages.

In order for the EA to provide a high-fidelity analysis we divided the architecture into three synchronized simulation components: the Architecture simulation, the Combat

simulation, and the Network simulation; each contributing its own specialized data to the simulation. Interoperability between the simulation components was realized using HLA.

The architecture simulator is used to simulate the decision making processes of the overall executable architecture by monitoring, controlling and reacting to the other simulators within the EA. Arena, a tool developed by Rockwell Software, was chosen to implement the architecture simulator. We created an Arena Petri Net block.

For a combat simulator, we used JSAF, thus simulating single jet fighters, and the targets. JSAF also provides a visualization of the executable architecture.

The purpose of the communications simulation is to model the communication latency between different simulation entities and provide that data to the architecture simulator. The creation of Executable Architectures allows static architecture diagrams to be tested in a simulator. Verification and Validation (V&V) of the C4ISR architecture is enhanced through the use of executable architectures.

In summary, once the synchronized simulation components are running, it is used to perform what-if analysis and act as a gauge for measuring performance of the actual system during operation. In the TST demonstration, we could change performance and affect the projected outcome. If we continue to expand this Federated Executable Architecture Technology effort, we will have the capability to integrate the warfighters' operational environment by measuring and optimizing C4 performance, accrediting warfighter's processes, and verifying & validating (V&V) our LVC, C2 and C4 systems.

Since the EA effort was designed as an open platform, it can be reused and expanded by developing Federated Object Model (FOM)s for each LVC entity that you may want to include for conducting what-if-analysis. This effort also gives you the plug and play capability of picking simulation tools for their strengths or your personal

preference (instead of relying on one tool only). For example, you can use Arena, Bonaparte, etc., for running the operational architecture threads and use OPNET or NetTTS for the systems views.

This effort was not limited to the M&S community and all data associated with this effort has unlimited government use rights; if interested in more information, contact Mr. Hutt at AFAMS, DSN 970-5718 and visit: <https://www2.afams.af.mil/programs/projects/cma.html>

U.S. NAVY TO USE EMBEDDED TRAINING SIMULATIONS ON NEWEST COMBAT SHIPS

The Navy's next littoral combat ship, the LCS USS Freedom, will be fully fitted with embedded training simulation. The Navy has concluded that embedded training systems offer numerous advantages over other current surface training systems that provide "add-on" trainers appended to existing ship systems to stimulate sensors and send simulated images to operator screens. Captain Michael Arture, the Navy's program manager for the Total Ships Training program, says that "Having embedded training capability obviously provides an opportunity to be able to refresh the training, and provides more flexibility in training crews that are in place and skills that might be today more difficult to get because of the availability of systems either at the schoolhouses or opportunities to be at sea. [Consequently, embedded training] provides greater flexibility and greater opportunity to exercise the crews."

Embedded training, a simple mode in a system of this type, allows the warfighter to be more prepared because of its refresher training and mission rehearsal capabilities. Warfighters will be more prepared for their specific engagements. Another reason why the Navy is advocating embedded training is because they want to spend less money on shore-based training infrastructure, according to Patricia Brosey, LCS training lead for GDAIS, a supporting contractor. While tactical system changes and upgrades can be made almost immediately with onboard embedded training systems, in the

past it has taken schoolhouses years to keep up with such changes, she noted. Basically, all the training applications are just other components on the total ship computing environment, Brosey said.

According to LCS program representatives, one of the most critical needs for shipboard at-sea training is an integrated, live, virtual, and constructive framework that permits core sea frame crew individuals and teams, as well as the mission teams, to train in a common, collective, interactive and interdependent environment, immersing themselves in a training mode, while maintaining the safety of the ship's control, navigation and weapons systems. Another need is to reduce the workload on trainers by easing the training planning, management and assessment burden and affordability. Some of the specific advantages cited by training managers include higher fidelity training, reduced onboard space and weight requirements, and ease of scalability and extensibility to meet Joint and multinational interoperability training.

The foundation for the LCS embedded training systems will be the Total Ship System Training Architecture (TSSTA), an open architecture platform that will provide the infrastructure, interfaces and component functionality for all types of onboard and ashore training. The open architecture approach allows the use of COTS products to enable upgrading of embedded trainers quickly and efficiently with lower risk and cost, according to the NAVSEA LCS program managers.

JOINT STRIKE FIGHTER (JSF) PROGRAM TO INCORPORATE COMMON SIMULATOR TRAINING SET

Lockheed Martin, with primary responsibility for the JSF pilot and maintenance training system development, has announced that in March 2006 they will have a preliminary design ready for U.S. and international customer review. The unique aspect of this leading edge system is that it is the first time in a national-level fighter aircraft program that a single training program with a common set of simulator and training

equipment is being devised for all customers, regardless of Service or nationality. The F-25 Raptor, with its unique touch screen controls and helmet mounted displays that control virtually all of the aircraft's control, communications, and weapons systems, will pose equally unique challenges for supporting training systems, which much mimic the advanced technology without its associated costs or support requirements.

The initial training center is expected to have full motion and deployable mission-rehearsal high fidelity visual system simulators. In order to maintain software and hardware commonality between actual systems and simulators, the same software being developed for the F-35 will be used in the simulator design. Maintenance personnel will train on real-time, hands-on hardware trainers that simulate the aircraft ejection seat and its weapons loading systems. Training on the complex, highly automated aircraft systems will be through extensive computer-based training designed to deliver "just-in-time" refresher training to wherever a technician is deployed.

Training system developers are fully aware that there will be cultural and situational awareness-related training issues to take into account when training JSF pilots who are transitioning from other fighter aircraft. One of their biggest changes will be moving from a traditional cockpit to one almost totally void of dials and switches.

Initially, an integrated training center, most likely located at Eglin Air Force Base, FL, will provide crew training for all U.S. and International services. The system is scheduled to be ready by October 2009 at its U.S. location, with other international sites starting up in 2014. For original article from the Training and Simulation Training Journal (TSJ) Online visit:
<http://www.tsjonline.com/index.php>

KILLER APP

When U.S. Navy Capt. Paul Rosbolt wants to know which anti-submarine technologies work, he can get the answers. But how long does it take to get them?

"That kind of analysis is very difficult with our current modeling and simulation processes," said Rosbalt, program manager for undersea systems at the Program Executive Office for Integrated Warfare Systems (PEO IWS). "I have to hire one of the contractors that does modeling and simulation. I have to tell them what I want, send it over to them, let them run their models and apply their analysis and bring me back an answer. That takes money and it takes time.

"Frequently, when the answer comes back, it leads to yet another question," he said.

But new software will give Navy analysts a chance to do modeling on their own computers and at their own convenience. Kill Chain is a PC-based, multiwarfare tactical simulator. "We think we can substantially reduce the time and dollars required by creating an interactive tool that analysts at the Navy Yard and the Pentagon can manipulate themselves," Rosbalt said.

Kill Chain also fills a special niche in Navy modeling and simulation. Current models tend to come in two flavors, according to Rosbalt: campaign-level simulations that use generic cookie-cutter units, and extremely detailed engineering models. Neil Byrne, a former destroyer captain and Kill Chain's designer, said the simulation is unique in its ability to simultaneously run multiple missions, such as anti-submarine warfare (ASW) and anti-air warfare, in real time, as well as its use of real-life data.

Kill Chain is being developed by Symmetron, a Fairfax, Va.-based subsidiary of Mantech Gray Hawk. ASW, surface warfare and ship-based air defense are scheduled for the spring and fall of 2006, according to the Navy. Carrier air warfare, strike and expeditionary warfare are options that have not yet been decided.

Former Chief of Naval Operations Adm. Vern Clark approved Kill Chain for four missions in January, according to Byrne. They are technology demonstration, mission effectiveness evaluation, tactical development and evaluation, and training. For now, the focus is simulating ASW. If fully completed, Kill Chain will include a battle

group commander mode, scenario builder, multistation play on the SIPRNET network, and a database with 63 ship classes, nine submarines and 37 aircraft types.

Data in Kill Chain can be quickly modified to allow fresh analyses. "Currently, it takes time and money to change something as simple as the formation of ships around an aircraft carrier to make sure you've optimized your sensor conditions" Rosbalt said. "You can do that in this model by essentially clicking and dragging." For original article from The Training and Simulation Journal (TSJ) Online visit: <http://www.tsjonline.com/story.php?F=1196119>

NORTHROP GRUMMAN'S X-47 B J-UCAS TEAM SIMULATES CONTROL OF FOUR UNMANNED SURVEILLANCE ATTACK AIRCRAFT WITHIN AIRCRAFT CARRIER AIRSPACE

SAN DIEGO - Dec. 9, 2005 - Northrop Grumman Corporation has successfully completed a simulated exercise that demonstrated the simultaneous control of four X-47B unmanned aerial vehicles (UAVs) during U.S. Navy aircraft carrier operations.

The exercise, conducted Sept. 28 at the Naval Air Warfare Center Weapons Division in China Lake, Calif., is part of Northrop Grumman's work on the Joint Unmanned Combat Air Systems (J-UCAS) concepts demonstration program.

"This is a major milestone for the Northrop Grumman X-47B team," said Scott Winship, Northrop Grumman's X-47B program director. "We demonstrated the integration of multiple X-47Bs into carrier airspace using existing Navy flight and control procedures, which significantly increases the confidence of successfully introducing UAVs into normal carrier operations."

Using a surrogate aircraft which represented one X-47B, three additional simulated X-47B aircraft were successfully controlled during several flights using advanced mission-management software and air traffic control

procedures currently used by Navy aircraft carriers.

The air traffic controller provided standard commands to a single mission operator, who in turn ensured all four aircraft safely operated within the simulated carrier's airspace.

The demonstration illustrated the controller's ability to guide all four aircraft through the approach, wave-off and traffic pattern procedures, while accomplishing proper spacing and air traffic de-confliction. The mission operator was able to monitor the entire process to ensure proper command response and advise the controller on aircraft response or performance limitations.

The U.S. Air Force/Navy J-UCAS program will demonstrate the technical feasibility and operational utility of "stealthy" land- and sea-based unmanned surveillance attack aircraft, and provide the Air Force and Navy the option to acquire these systems early in the next decade. The X-47B design demonstrates a variety of foundational system capabilities including land- and carrier-based operations and automated aerial refueling. The design also demonstrates key mission-requirement capabilities like persistent surveillance and reconnaissance, all-weather precision targeting, and precision attack of fixed and mobile surface targets. For complete article visit: http://www.asd-network.com/press_detail_B.asp?ID=6175

MODELING AND SIMULATION STAFF OFFICER COURSE (MSSOC) 2006

The three-day MSSOC course provides a broad overview of modeling and simulation (M&S) policy and activities of the Department of Defense (DOD), with discussion of how DoD employs M&S in support of training, analysis, acquisition of new products and systems, test and evaluation (T&E) and experimentation. The course focuses on M&S terms, concepts, applications, and information resources, preparing attendees for positions that require conversancy in these topics. Students will gain familiarity with major M&S concepts, policies, organizations, programs,

activities, and issues within the Department of Defense. Continuous Education Units (CEUs) are available for this course.

The goal of this course is to provide students with a foundation of knowledge that will enable them to make informed decisions about the use of M&S in training, analysis, acquisition, operations, T&E and experimentation activities.

For the MSSOC 2006 Class Schedule visit: <http://www.education.dmsomil/upcoming.asp>

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